BIOLOGY DEPARTMENT

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JUNE 25, 1949

INDEX

SCIENCE NEWS LETTER

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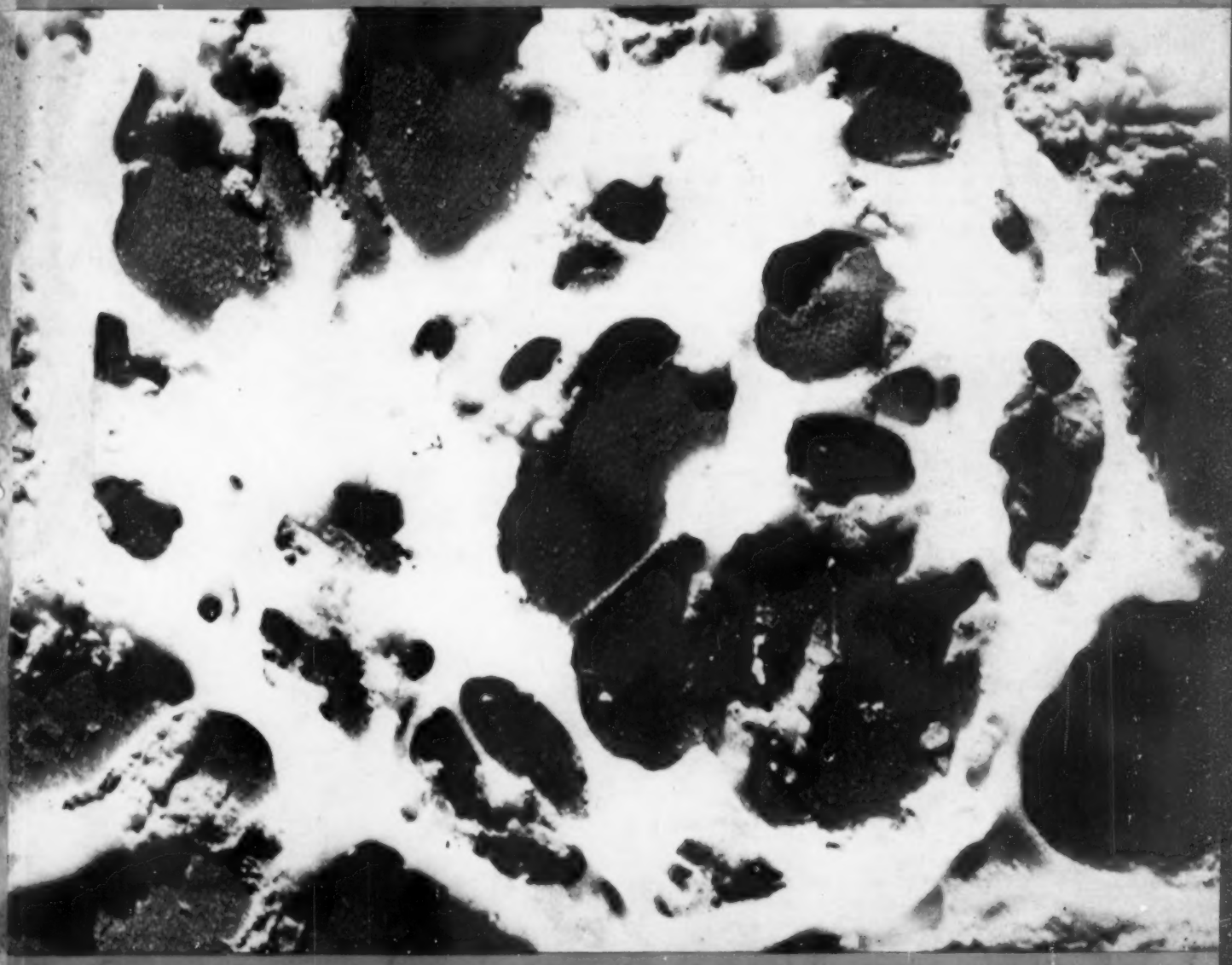
THE WEEKLY SUMMARY OF CURRENT SCIENCE



Frog's Eye, 25,000 X

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A SCIENCE SERVICE PUBLICATION

$5.00 A YEAR

VOL. 55 PAGES 401-412

MEDICINE

Hormone Aids Muscle Ill

Injections of adrenocorticotrophic hormone, which is produced by the pituitary gland in the head, were found to help patients with a muscle weakness disease.

➤ ONE of the hormones just reported as helpful in arthritis now turns out to be also involved in a muscle weakness disease, myasthenia gravis.

The hormone is one produced by the pituitary gland in the head and is known as ACTH, short for adrenocorticotrophic hormone. The long name shows that it is a hormone which stimulates the outer part, or cortex, of the adrenal glands. Compound E, now known as cortisone, primarily hailed for its effect in arthritis, is a synthetic adrenal cortex hormone.

Improvement in three myasthenia gravis patients after injections of ACTH was reported by Drs. Clara Torda and Harold G. Wolff of New York at the meeting of the American Neurological Association in Atlantic City.

The "incomplete remission," as they label the improvement, has persisted, though the doctors do not know how long it will last.

"Marked improvement of muscle function" is one of the signs of the remissions. This improvement occurred while the patients were taking much less than their usual dose of neostigmine, synthetic chemical now used in treatment of the disease.

The amount of work performed in muscle tests became similar to that of healthy persons, although before the ACTH these patients' work on the tests averaged only 30% of normal.

Chemical tests and blood counts also showed signs of improvement.

The New York doctors do not call ACTH a cure for the disorder, but said that the results in the three patients support the view that it is involved in the mechanism of the disease.

The immediate cause of the symptoms of this muscle weakness disease, they explained, is a decrease of synthesis in the body of a chemical, acetylcholine, which is believed to play a part in the transmission of nerve impulses to muscle cells. Increasing the ACTH in the body causes more acetylcholine to be produced. This and other findings showing a possible connection between the hormone and the muscle weakness disease led to trial of the hormone in the three patients.

When babies are born with muscle weakness or defects, it may be due to congenital myasthenia gravis, Dr. Paul M. Levin of Dallas suggested. He reported two cases in a brother and sister. These babies did not kick and move as much before birth as most babies do, and both showed symptoms of muscle weakness after they were born.

The weakness was quite severe and widespread in the boy. The sister had it almost exclusively in the muscles around the eyes. In both cases doses of neostigmine by mouth and by hypodermic injection caused striking changes in facial expression and ability to use the muscles. Two of the mother's first cousins had been born with drooping eyelids, suggesting a congenital, or hereditary basis. The mother, however, did not develop muscle weakness when given a full dose of quinine sulfate as a test for potential myasthenia gravis.

Some patients with myasthenia gravis have recovered after having the thymus gland in the chest removed. To appraise the value of this operation, since patients sometimes have periods of freedom from symptoms without treatment, Dr. L. M. Eaton of Rochester, Minn., compared 73 patients operated on before Jan. 1, 1948, with 186 who did not have the operation but were given other treatment during the same period.

A higher percentage of remissions, that is, freedom from symptoms, occurred in the group that had the operation. But, Dr. Eaton pointed out, the better results may have been due to the selection of the patients, rather than to the operation itself.

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WILDLIFE

Monkeys Half as Big as Rats Shown in American Zoo

➤ A PAIR of miniature monkeys, half as big as rats and ten times as active, are on exhibition at the National Zoological Park in Washington, thanks to a Panagra pilot, Capt. John H. Miller, who got them in Ecuador and sent them to Dr. William Mann, director.

These pigmy marmosets are widely distributed in South America, particularly along the Amazon. They have sparkling eyes that make them appear to have an intelligence that they don't possess.

They can't be let out of their glass cage for fear they will escape. They have to be fed through a small door that is closed by the keeper's hand while the food is put in the cage.

A pair of big-eared foxes from Cape Colony, Africa, and three kangaroos from Australia are also new exhibits.

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The British Royal Air Force is making an aerial photographic survey of some 150,000 square miles of *Africa*, much of it unexplored, to secure information for African development.

MINIATURE MONKEYS—These pigmy marmosets are half the size of a rat. They inhabit the region along the Amazon in South America.

MEDICINE

Conquest of Large Germs

Amebic dysentery, shingles and pemphigus are being checked by aureomycin. No antibiotic had previously been found effective against large germs like amebae.

➤ AUREOMYCIN, the golden yellow antibiotic drug, is now being used successfully to treat amebic dysentery, shingles and pemphigus.

These new triumphs for the drug have only been achieved within the last few weeks. There has not been time for all the reports to be published in scientific journals or to get them on the program of the American Medical Association meeting. But doctors attending the meeting heard the news from each other.

Considered very significant are the good results in amebic dysentery which Drs. L. V. McVay, R. L. Laird and D. H. Sprunt of the University of Tennessee and the John Gaston Hospital, Memphis, report in the journal, SCIENCE (June 10). The drug gets big germs of this widespread disease out of the patient's body usually within three days.

The importance of this finding lies in the fact that this is the first inkling anyone has had that any antibiotic drug would be effective against large germs like amebae, which belong to the class of protozoa. There is hope, now, that other diseases caused by protozoa may also be conquered by aureomycin. Included in Dr. Sprunt's cases is one patient who recovered even after an amebic ulcer had perforated the intestine.

The excruciating nerve pain of shingles, often requiring narcotics to stop it, is relieved within 12 hours after aureomycin treatment has been started. The skin eruption begins to dry up within 48 hours. Doctors in New York and Boston are getting these results in this long-lasting virus-caused disease, known medically as herpes zoster. They find, however, that the drug must be used early in the disease. If started after two months, it is not so effective.

Pemphigus is a little-known disease that starts with a skin eruption like that of shingles. In one form, the skin sores ulcerate and the germs, believed to be a virus, get into the blood. Patients are sometimes covered with the ulcerating skin sores. They become invalids for life, if they do not die of the disease, as in many cases they do. Skin specialists at Presbyterian Hospital in New York are now sending patients with this disease home, "to all intents and purposes cured" by aureomycin.

Still another disease over which aureomycin is triumphing is the kind of meningitis caused by hemophilus influenza. This is not the germ that causes influenza, but the meningitis it causes was 100% fatal. Serum and sulfa drugs helped bring down the death toll. Dr. Theodore E. Woodward of Baltimore stated that he had cured five babies under a year old of this disease with aureomycin alone.

Good news about aureomycin comes, too, from scientists of Lederle Laboratories who make the drug. The nausea and vomiting that has been a disturbing side effect will not trouble patients getting the drug in the future. This happy result is expected from a change in the production method.

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LARGE-EARED FOXES—This pair of foxes from Cape Colony, Africa, are on exhibit at the National Zoological Park in Washington.

WILDLIFE

Migration Routes of Yellowstone Elk Studied

➤ ELK HERDS migrate, just as flocks of ducks and geese do, only they do not go so far and they naturally move more slowly. But they do follow regular travel-ways by thousands, stated Victor H. Cahalane, chief of the biology branch of the National Park Service, before the meeting of the American Society of Mammalogists in Washington.

The largest elk herd remaining in the United States spends its summers in the mountains near the southern boundary of Yellowstone National Park, and when the first heavy snows fall in late October or early November the animals start to move toward their winter range in the lower part of Jackson Hole. (*See SNL*, May 14, p. 311). The herd moves southward on a front about 30 miles wide.

Kind of weather has considerable effect on the rate at which the elk move, Mr. Cahalane declared. If the snowfall is light they go at a leisurely pace, taking as much as two weeks to reach their winter quarters. But if a heavy blizzard strikes, they hurry up, making the trek in half that time.

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PALEONTOLOGY

Flesh Remains of Ancient Animals Dug up in Alaska

➤ RUSSIAN scientists did do it first, but their monopoly has been broken.

Officials of the American Museum of Natural History in New York announced that the actual flesh remains of prehistoric animals discovered in Alaska are on display. Included is the body of a young muskox which died some 15,000 years ago and was preserved in a natural deep freeze in Alaska.

These specimens are among the first ever found on the North American continent, though Russian scientists have been digging up this sort of thing in Siberia for years.

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ASTRONOMY

Atmosphere Big and Hot

Research shows that the earth's atmosphere extends some 10,000 to 15,000 miles out, and the temperature beyond the first 400 miles is around 4,000 degrees F.

➤ THE EARTH'S atmosphere is bigger—and hotter—than has previously been estimated.

Scientists of a non-profit organization doing research for government agencies, the Rand Corporation, have put together all the scientific information about the earth's atmosphere.

Here are some of the startling facts their research has indicated:

The earth's atmosphere extends to a distance of 10,000 to 15,000 miles out from the surface of the earth.

From 400 miles out on to the outer reaches of the atmosphere, there is a uniform temperature of some 4,000 degrees Fahrenheit. This, despite the fact that at some 50 miles from the earth the temperature is about 50 degrees below zero Fahrenheit.

Ten thousand miles above the earth, the atmosphere has a pressure 1,000,000,000,000,000,000 (a billion billion) times smaller than it is at sea level. Best man-made vacuum pumps do not approach this low pressure.

Just beyond the atmosphere, outer space is filled with highly rarefied hydrogen gas at a temperature of 18,000 degrees Fahrenheit.

Gases in the atmosphere are pretty much the same at 200 miles as they are on the surface, largely nitrogen and oxygen. Above 200 miles, the nitrogen increases until an altitude of 2,000 to 3,000 miles is reached. Here the atmosphere is mainly nitrogen. Above 4,000 miles altitude, however, the nitrogen decreases rapidly and hydrogen and some helium are found in the rest of the atmosphere.

Some of these hydrogen and helium atoms are believed to escape into interplanetary space, but helium is continually released at the surface of the earth by chemical processes. Hydrogen atoms may be fed into the upper atmosphere from interplanetary space.

At some 10,000 miles above the earth, where the pressure is many times less than that in any vacuum pump, there are about a million atoms in air per cubic foot. This means that the atoms are about an eighth of an inch apart. But because the atoms are so small, they probably travel 10,000 miles before colliding with other atoms.

Because the atmosphere is so rarefied at this altitude, the scientists explain that the high temperature probably does not affect such things as meteorites. They estimate that the heating of a meteorite in the atmosphere does not take place until it reaches altitudes as low as about 60 miles.

Best knowledge of what the atmosphere is like at great distances above the earth has come from studies with radio waves which are reflected by the ionosphere. This region of the atmosphere is where negatively charged particles have been stripped from atoms and molecules of the atmospheric gas. These particles, called electrons, form a gaseous layer which plays an important role in some types of radio communication.

The Rand study, thus far, has been carried out only for the reaches of the atmosphere above the equator and the middle latitudes but not over the polar regions.

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● RADIO

Saturday, July 2, 3:15 p.m., EDST

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. H. L. Johnston, director of Cryogenic Laboratory, Ohio State University, will talk about "The Ultimate Fuel."

SCIENCE NEWS LETTER
VOL. 55 JUNE 25, 1949 No. 26

50,300 copies of this issue printed

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., NOrth 2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., $5.50; 2 yrs., $10.00; 3 yrs., $14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change, please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

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Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C. under the act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., PEnnsylvania 6-5566 and 360 N. Michigan Ave., Chicago. STAte 4439.

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Photographs: Cover, National Bureau of Standards; p. 402, p. 403, Fremont Davis; p. 405, Harvard University; p. 406, National Geographic Society.

MEDICINE

First Betatron Treatment

20,000,000 volt X-rays were used on the first human cancer patient to be treated with the atom-smasher. The method holds hope for others, doctors stated.

➤ FIRST USE of the atom-smashing betatron in the treatment of a human cancer patient is announced by an 18-man corps of doctors.

The patient who was the first to be treated with 20,000,000 volt X-rays was a 27-year-old student suffering from glioblastoma. This is a malignant brain tumor. The young man had been operated on and given a course of conventional X-ray treatments without success.

Unfortunately, he died a month after the betatron treatment. But from the experience with his case the doctors conclude that "the betatron offers good methods for tumor regions of any shape and in any position in the human body."

An increased number of cures of deep-seated tumors and decreased cases of radiation damage should, the doctors think, result from use of the betatron.

The 18 doctors from the University of Illinois, the Carle Hospital Clinic of Urbana, Ill., and the Tumor Clinic of Michael Reese Hospital in Chicago, spent about 2,000 man hours in the treatment of this case. In their report to the AMERICAN JOURNAL OF ROENTGENOLOGY AND RADIUM THERAPY they state:

"It seemed that the man had a small but not entirely negligible chance of cure if treated with the betatron. The moral issue was simple. We could let the patient die without disturbing him further, or he could be given a last chance. This could be done without much inconvenience either to him or his family. There was little doubt as to which decision to make.

"As there was no other betatron available for clinical work at the time, it was proposed to use the 22 mev. (million electron volt) machine at Urbana. The University authorities cleared the machine for use in this one case, and the staff of the Carle Hospital Clinic accepted the medical responsibility."

The task of the doctors was to co-ordinate the miscellaneous relevant information and to perform additional tests until one coherent method developed out of the various details. There were recognized risks in the use of 20,000,000 volt roentgen rays from the betatron and these had to be minimized.

"With high energy rays, it is possible to treat any region anywhere in the body with high doses without reaching dangerously high levels outside the predetermined region," the report continued. "It is feasible and it may be desirable in selected cases, to achieve a caustic or almost caustic effect in the depth. With low energy equipment, this can be done only in accessible regions of the body.

"For our patient, treatment with high doses to a restricted area was clearly the only possibility. He had previously been given a course of roentgen (X-ray) treatments with large fields and medium dose, with negative results. These treatments had produced radiation sickness, without any evidence of tumor response.

"Glioblastomas are often not radiosensitive, and the particular one with which we were dealing had already proved that it was not. Hence, the only remaining chance to control it was the administration of very high doses.

"We restricted our attention to that part of the potential tumor-bearing region which we felt we could destroy without incapacitating the patient."

The method of treatment required accurate positioning of the head. This meant elaborate and painstaking advance preparations through the use of an exact plaster model of the patient's head and the production of two molds to hold his head in exact position.

The patient's body had to be rotated easily about the center of the tumor. A steel platform was built and made to pivot. A method had to be devised whereby the head rest, with the plaster head in place, could be aligned so that the central ray impinged upon the selected meridian and passed through the center of the tumor region.

Every step of the betatron treatment was first worked out with the head replica so that there would be no mistake. The radiation limits were fixed so that no live and healthy tissue would be touched.

During the first week of the treatment, the patient showed slight but definite improvement. There was no sign of radiation sickness. In the second week, he developed weakness and the radiation treatment was stopped. Lung congestion developed before he died.

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NUCLEAR PHYSICS

"In-Between" Atom Smasher Is Unveiled at Harvard

➤ AN "in-between" atom smasher has been unveiled at Harvard University.

The new 800-ton synchro-cyclotron is uniquely valuable, it was explained, because it is bigger than small cyclotrons, but smaller than the giant new ones underway or completed elsewhere.

The Harvard cyclotron boasts a top energy of 125,000,000 electron volts. It is the only one built or planned in this country that falls within the range from 30,000,000 to 200,000,000 volts. Thus, physicists may be able to make important studies with this new atom smasher, filling gaps between researches with the smaller and larger cyclotrons.

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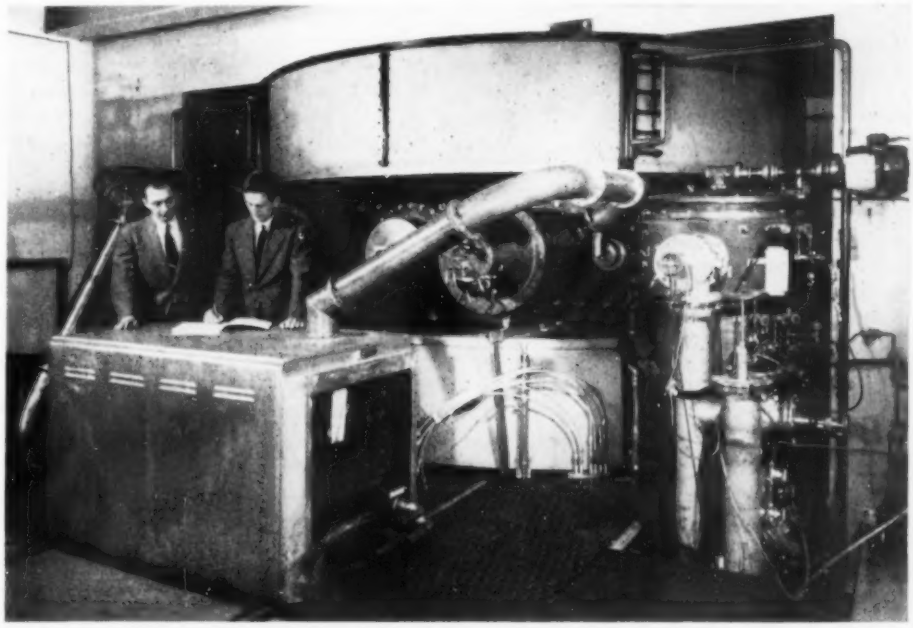

"IN-BETWEEN" ATOM-SMASHER—This is Harvard's new synchro-cyclotron which is the only machine built or planned in the area between 30,000,000 and 200,000,000 volts.

PHYSICS-BIOLOGY

Cut Tissue Ultra-Thin

See Front Cover

➤ HOW thin is a slice? With a new method developed by the National Bureau of Standards it is so thin that a stack of 750 slices would be as thick as an average human hair.

The Bureau's slicing technique was developed for study of thin sections of tissue under the powerful electron microscope. Terming the new advance "truly exciting," Bureau Director Edward U. Condon said that it "promises to be an important aid in such fields as cancer research." Researchers in biology, medicine, agriculture and even the physical sciences are expected to use the new super-thin slicing.

Here's how Bureau scientists cut world's thinnest slices:

The specimen to be sliced is embedded in a clear plastic (n-butyl methacrylate, similar to plexiglas or lucite but softer). This embedded specimen is mounted in a brass block and cooled by carbon dioxide gas. As the atmosphere warms the brass block, it expands for such a tiny distance that you cannot see the movement. After this expansion, the tiny bit of the specimen which protrudes is cut with a laboratory slicing device, called a microtome.

The slice is so thin that you can't see it edgewise under the most powerful light microscope.

On this week's cover of the SCIENCE NEWS LETTER a section of a frog's eye is shown magnified 25,000 times its actual size.

This new method was developed by three Bureau scientists, S. B. Newman, E. Borysko and Max Swerdlow.

Chief advantage of these thin slices is for studies under the powerful electron microscope. Because the electron beam of this instrument has only slight penetrating power, specimens for study must be made extremely thin.

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REHEARSAL FOR SKY SURVEY *—Dr. Edwin P. Hubble is shown with the 48-inch Schmidt photographic telescope which will be used to provide the world with the first definite photo atlas of the heavens. The four-year project will be launched July 1 by the National Geographic Society and Palomar Observatory.*

ASTRONOMY

Sky To Be Photographed

➤ A PHOTOGRAPHIC survey of the sky using the 48-inch wide-angled Schmidt telescope which is located on Mt. Palomar, Calif., was announced jointly by the California Institute of Technology, operating the observatory, and the National Geographic Society, co-sponsoring the project.

For about four years this Schmidt survey will be recorded on 14 x 14 inch plates. It is planned at the end of that time to produce a sky atlas of some 2,000 reproductions of photographic plates, covering about three-quarters of the heavens, and selling for about $2,000.

The survey photographs taken with the wide-eyed telescope will guide Palomar's 200-inch telescope, world's largest, to intensive, small-area study.

Virtually identical exposures of each area of the sky reached will be made using both blue and red filters for comparison. A blue exposure will take a half hour and a red exposure twice as long. The best night's work will make only four pairs of photographs.

Photographs will be taken with light that has traveled for 300,000,000 years (at 186,000 miles per second) from the most distant objects to be photographed.

The Schmidt survey photographic work will be in charge of Dr. Albert G. Wilson, assisted by Dr. Josef J. Johnson and Robert G. Harrington, with Dr. Edwin P. Hubble director of the project.

The most famous astronomical atlases of the past are the Ross atlas made at Yerkes Observatory, largely devoted to the Milky Way, the Wolf-Palifa charts issued earlier from Heidelberg, and the British Franklin-Adams charts of about three decades ago. These atlases were issued in book form.

Harvard Observatory has the largest collection of photographs of the sky in the world, consisting of about a half million photographic plates made with about 40 different telescopes from both the northern and southern hemispheres. The whole heavens have been covered perhaps a thousand times by half a dozen different Harvard telescopes surveying the metagalaxy and recording more than half a million galaxies, great stellar aggregations like our Milky Way.

The 48-inch Schmidt telescope on Palomar is at present the largest telescope of its type in service. A larger instrument, a 60-inch Baker-Schmidt telescope of Harvard College Observatory, will be located at its Bloemfontein, South Africa, station in the future. Upsala Observatory in Sweden is building a 48-inch Schmidt instrument which will equal the Palomar instrument. Scheduled for completion next year is a 32-inch Baker-Schmidt telescope to be located at Bloemfontein as the joint enterprise of Northern Ireland's Armagh Observatory, Eire's Dunsink Observatory and Harvard Observatory. The Mexican National Observatory Tonanzintla has had a 26-inch Schmidt since 1942 with the world's largest astronomical prism, built with the cooperation of Harvard. About 40 lesser Schmidt instruments are in use.

The Schmidt camera is neither a reflector nor a refractor, but rather combines the two since it employs both a mirror and a lens.

The ordinary reflecting telescope focuses the rays of light from a star by means of a mirror of special design. Rather than being sphere-shaped, it is a paraboloid.

Bernhard Schmidt of the Hamburg Observatory at Bergedorf, Germany, hit upon the idea of placing a specially figured lens far in front of a spherical mirror. Light rays entering the telescope are bent by this lens, before they strike the mirror, in such a way that all are brought to a focus at about the same point.

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GEOLOGY

New Geological Institute To Have 10,000 Members

➤ TEN thousand scientists who find our minerals, study our oil fields, and discover the record of the rocks for past ages have joined to form the American Geological Institute with Dr. David M. Delo as executive director.

With headquarters at the National Research Council in Washington, the institute will act for 11 geological, mining, geophysical and other professional societies.

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ASTRONOMY

Two Bright Planets Visible

Venus can be seen at early dusk in the west while Jupiter will be visible at night in the southeast. Brightest among the stars will be Vega.

By JAMES STOKLEY

➤ TWO bright planets are now visible in the evening skies. Soon after the sun has gone down, if you look toward the west, you will be able to spot Venus as a brilliant "evening star" in the constellation of Cancer, the crab, although at that time none of the stars around it will be apparent. Venus is now of magnitude minus 3.3 on the astronomer's scale, which is considerably brighter than any other star or planet, so it is quite easy to identify.

Although Venus follows the sun below the horizon about an hour and 20 minutes later, by that time Jupiter will be visible in the southeast, in the constellation of Sagittarius, the archer. This giant planet is now about two fifths as bright as Venus, of magnitude minus 2.3. Since it will appear in a completely dark sky, while Venus is seen in the gathering dusk, there may not seem to be such a difference between them.

The position of Jupiter (but not of Venus, since it sets too early) is indicated on the accompanying charts of the July evening skies. These are drawn for about 10:00 p. m., your standard time, at the first of the month, and an hour earlier at the middle. (Add an hour if you are on daylight time.)

Vega Brightest

Brightest among the stars that are shown is Vega, in Lyra, the lyre, which is high in the east. Below it, and a little toward the north, can be seen Deneb, in Cygnus, the swan. About as high, but more southerly, we can see Altair, in Aquila, the eagle. It is below the western part of Aquila that we find Sagittarius, present home of Jupiter. In this group are two characteristic figures, one of which is called the "milk dipper." The bowl of this implement is formed by the four stars indicated on the map directly about the "riu" in the word Sagittarius, while the handle is formed by the two stars extending upwards and to the right, toward the "m" in Scutum (the shield), the constellation directly above.

The other figure in Sagittarius is the teapot, of which the handle is formed by the same four stars that make up the bowl of the milk dipper. The two stars that form this dipper's handle also mark the lid of the pot, and its spout is to the right, next to the curved row of stars that make the tail of Scorpius, the scorpion. From the way that the teapot tilts over as the night advances, it is sometimes said that the hot tea is poured out on the scorpion's tail!

In Scorpius is the bright star, definitely red in color, called Antares. As we move farther west, toward the right, we come next to Libra, the scales, a constellation with no first magnitude stars. After Libra comes Virgo, the virgin, with first magnitude Spica. Continuing, to the right of Virgo, low in the west, Leo, the lion, can be located. Saturn, another planet, is in this group, and is indicated just above the horizon, where it is quite faint. Earlier in the evening, however, you can see it better, near the bright star Regulus, which is not shown. Above Virgo is Bootes, with first-magnitude Arcturus.

Toward the north there are no stars of the first magnitude, though some very familiar groups may be seen. Chief of these is the one in Ursa Major, the great bear, called the "Big Dipper." It hangs with the handle upwards, in the northwest. The two stars at the bottom of the dipper's bowl, Merak and Dubhe, are the pointers, which show the direction of Polaris, the pole star, in the north. This, in turn, is at the end of the handle of the little dipper, the bowl of which is above, and is part of Ursa Minor, the little bear.

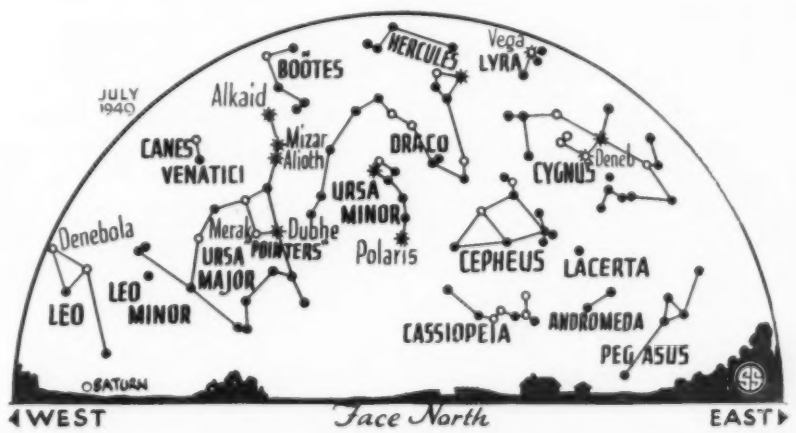
Winding around this group is Draco, the dragon, whose head is close to Hercules, the strong man, a group directly overhead for the times the maps indicate. To the right of Ursa Minor, just below one of the curves in the body of the dragon, is Cepheus, the king, and just beneath this figure one finds the W-shaped group of Cassiopeia, his queen.

At the beginning of July, low in the east, the planet Mercury can be glimpsed just before sunrise. Mars is in the same part of the sky, and can be seen a little before sunrise in the constellation of Taurus, the bull. Because of its distance from the earth, it is now quite faint, of the second magnitude.

To the unaided eye the planet Jupiter, which shines so brilliantly in the south, is a conspicuous object, but it becomes more interesting when seen through a small telescope. Then one can see its four largest moons, part of the system of 11 satellites (there may be even more still undiscovered) that revolve around the planet. On the night of July 7, for example, one of the four will be seen to the west, and the other three toward the east. The following night, however, only two will appear, as the others will be in front of the planet's disk. The next night all four will be visible again, but with one to the east and the others to the west. On July 10 all four will be to the west, but on the following nights, up to the 15th, two will be visible on each side. They will not, however, always be the same satellites, on the one side or the other, and their distances will be different. On the 16th two will be seen, both to the west, the remaining pair this time being behind the planet. Diagrams showing these configurations are published each year by the U. S. Naval Observatory in the American Ephemeris, which is the astronomer's bible.

Satellite Discovery

These satellites and their movement were discovered in the year 1610 by the Italian astronomer Galileo Galilei, and they were used in 1676 by a Danish astronomer named Olaus Roemer, who was working in Paris, to make the first determination of the speed of light. Jupiter and the earth both revolve about the sun, the former at a mean distance of 483,300,000 miles and the latter at 93,000,000 miles. When the two planets are in the same direction from the sun, as they are on July 20, they are closest. This month they are 382,300,000 miles apart. However,



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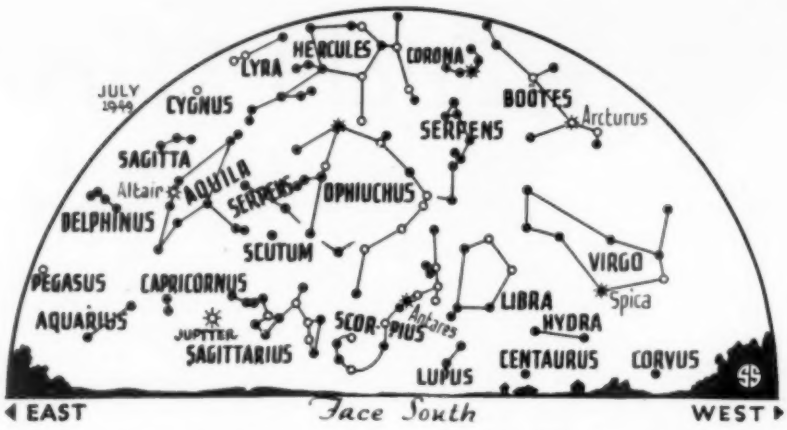

☼ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

when Jupiter is on the far side of the sun, it is about 186,000,000 miles (the diameter of the earth's orbit) farther away.

In the half century following Galileo's discovery of these moons of Jupiter, astronomers began to make predictions as to when they would disappear behind the planet and make their reappearance. When Roemer observed these events, and measured their times accurately, he found that sometimes they were earlier and sometimes later than the prediction. Puzzled at first, he finally realized that they were early when Jupiter was closest to us, and late when it was farthest away. This gave him the clue to a correct explanation of the differences. The eclipses, etc., took place on schedule, but when Jupiter was on the far side of the sun the light had to travel all the way across the orbit of the earth. On the other hand, when the two planets were on the same side of the sun, the light had a much shorter path.

As a result, he announced in a paper to the French Academy of Sciences, published Dec. 7, 1676, that light takes 22 minutes to cross the earth's orbit, so that it would require 11 minutes to get from the sun to the earth. Modern observations make it 8 minutes 19 seconds, which corresponds to a speed of light of 186,000 miles per second.

Time Table for July

July	EST	
2	4:00 p. m.	Earth farthest from sun, distance 94,453,000 miles
	5:00 p. m.	Moon nearest, distance 229,800 miles
10	2:41 a. m.	Full moon
	8:00 p. m.	Moon passes Jupiter
16	9:00 p. m.	Moon farthest, distance 251,000 miles
18	1:01 a. m.	Moon in last quarter
20	3:00 a. m.	Jupiter nearest earth, distance 382,300,000 miles
23	6:07 a. m.	Moon passes Mars
25	2:33 p. m.	New moon
27	1:22 p. m.	Moon passes Venus
28	early a. m.	Meteors of Delta Aquarid shower visible
	8:00 p. m.	Moon nearest again, distance 227,600 miles
31	1:00 a. m.	Moon passes Saturn at distance of about a third the lunar diameter

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, June 25, 1949

Oslo, capital of Norway, has 170 square miles of land within the municipal area, about three times as much as the District of Columbia; much of it is "wild" terrain, with moose, deer, wild cats, foxes, rabbits and badgers roaming at large.

ERRATA, Vol. 55, Nos. 1-26, January-June, 1949

PAGE	TITLE BEGINS	CORRECTION
15	New Insect Immigrants	Headline, Immigrants *for* Emigrants.
28	African Dams	Last par., line 5, Lake Victoria *for* Victoria Falls.
62	Record-Breaking Cold	Par. 5, line 10, Montana *for* Wyoming.
114	British Lead in Bevatron	See Letters to Editor, p. 132.
130	Vitamin B_{12}	Line 1, after B_{12} *insert* per unit of weight.
131	Menhaden is America's	Par. 3, lines 7, 8, *read* the fish meal is used for animal and poultry feed and fertilizer.
152	Scientists, Too, Object	Line 4, Bitter *for* Bittner.
152	Disease-Bearing Villains	Villains *for* villians.
172	Mercury Vapor	Line 6, after generator *add* since the war.
220	FIDO	Last line, droplets *for* vapor.
260	Blood Test for Cancer	Col. 2, line 13, prostate *for* prostrate.
268	New Conducting Plastics	Col. 2, line 14, mercury *for* copper.
297	Americans and Canadian	Par. 4, line 4, the *for* an.
340	Canners	Col. 2, line 12, in the 1840's *for* 1819.
347	British Get	Line 5, *read* McGregor Fund, Detroit. *Delete* rest of sentence and Par. 5.

FORESTRY

American Tropical Woods

➤ BURMA teak, long a favorite wood for naval use because it is durable and expands or contracts little under marine conditions, may soon give place in American vessels to nearby woods from Central and South America. Equally good wood seems to be available in the American tropics.

Mahogany, regarded as the highest quality boat planking because of its dimensional stability, may also be displaced by little known but equally stable wood from the tropical Americas. Among the rivals of both teak and mahogany are the Frijolillo of Central America, Laurel Blanco of Honduras, Yellow Sanders of the West Indies, Roble Blanco of Central and South America, and Primavera of Mexico and Central America.

A program of research, concerned with the woods of the Western Hemisphere, and sponsored by the Office of Naval Research, is underway at the Yale University School of Forestry. Much progress has been made. Types of wood little known in the United States, and their properties, were reported by Dr. George A. Garratt, dean of the school. He spoke as a guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network.

Tapping the wood of the tropical region has been a dream of those who are charged with finding enough of suitable woods to fill America's national needs. The tropics contain many woods of greatly diverse properties. Balsa wood, now well known in the United States, is one of the lightest of all woods. It weighs less than six pounds per cubic foot, about 10% of the weight of water. The American tropics also produce lignum-vitae, a wood that weighs about 75 pounds a cubic foot, or 12.5 pounds more than water.

There are other ways in which various kinds of wood are very, very different, Dr. Garratt stated. There are woods that decompose within a few weeks in contact with the soil or other sources of moisture. Yet some varieties endure for hundreds of years under similar conditions. Some are easy to work such as the soft, easily-carved White Pine. In contrast there is dense, mineral-containing Manbarklak, so refractory that it dulls ordinary woodworking tools within a few minutes.

There are in the United States some 800 tree species native to the country. The forests of Central and South America include over 10,000 tree species. Certain of these tropical woods may be superior in many respects to the woods now used in this country for many special purposes, he declared.

The Yale University School of Forestry has been engaged in research in the field of tropical woods for more than 25 years. It has a collection of over 45,000 specimens, mostly tropical in origin, that represent some 12,000 individual species. Much of the scientific work has been concerned with a study of the properties of these woods. Two years ago the scope of the activities was expanded in response to the growing need for technical data relating to the properties of tropical woods for industrial applications.

Science News Letter, June 25, 1949

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OPHTHALMOLOGY

Eye Specialists Urge More Study on Contact Lenses

➤ MORE research and less commercial exploitation of contact lenses is urged by the American Committee on Optics and Visual Physiology in a report to the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (June 18).

The report is signed by Dr. Conrad Berens of New York, chairman of the committee which represents the A. M. A., American Ophthalmological Society, the American Academy of Ophthalmology and Otolaryngology and the Association for Research in Ophthalmology.

The eye specialists are sympathetic to the person whose feeling of inferiority is made worse by having to wear spectacles.

"For such persons the wearing of contact lenses may be a great boon," the committee states.

But they do not want the public to be "oversold" on the use of contact lenses. Most patients can only stand wearing them for a limited period of time, and even when properly fitted, there is blurring or hazy vision after a few hours, the committee finds.

The sale and fitting of contact lenses by lay persons not properly licensed by state laws to care for eye conditions is termed "dangerous."

Suggestions include courses for eye specialists to learn more about contact lenses and less exploitation of them by manufactures.

Contact lenses fit over the eyeball inside the eyelids. In some kinds of eye trouble which are difficult if not impossible to correct with ordinary spectacles, contact lenses are particularly useful. Originally developed for such cases, contact lenses have been gaining popularity among spectacle wearers for cosmetic reasons, since the contact lenses do not show when worn.

Science News Letter, June 25, 1949

"E" Galvanometer Saves Space And Time In Lab

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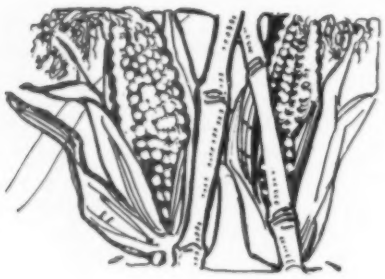
AGRICULTURE

NATURE RAMBLINGS

by Frank Thone



Overlooked Anniversary

➤ HYBRID CORN, now waving its proud green banners over millions of American acres, might appropriately celebrate its fortieth birthday this year. The first public proposal to improve corn and increase its per-acre yield by crossing genetically pure parental lines was made in January, 1909, by Dr. George H. Shull, then of the staff of the Carnegie Institution of Washington and later of Princeton University, in an address before a meeting of the American Corn Breeders Association at Columbia, Mo.

Hybrid corn did not begin to sprout from the soil immediately after that. New ideas of any kind seldom make a quick conquest; and agriculturalists in general are especially likely to be conservative. A great deal of experimental work had still to be done, and many points of difference thrashed out among the researchers, before the first field was planted with the new-type seed. Especially lively was the discussion between Dr. Shull and Dr. Edward M. East of the Connecticut Experiment Station, though the sparks they threw off fortunately generated more light than heat. Dr. Donald F. Jones, one of Dr. East's disciples, originated the double-cross method, now generally used, in which four pure lines are employed, first producing two hybrids and then using these as parents of the final strain.

There were many early workers in the field of corn genetics and practical corn breeding besides these two pioneers, but it would be impossible to list them all.

Henry A. Wallace, often hailed in print as the originator of hybrid corn, is always embarrassed at such attribution. He certainly never claimed such honors for himself. Skeptical since boyhood of the value of older methods of seed-corn selection, he became an early convert to the hybrid-corn idea, used the family's farm journal as a pulpit for preaching it as sound doctrine to many thousands of practical dirt farmers, and financed with "venture capital" the first company devoted exclusively to the production and sale of hybrid seed corn.

Slow to take hold at first, hybrid corn finally swept its older rivals from the field. Yields per acre, as compared with open-pollinated corn, are commonly estimated as at least 20%.

Science News Letter, June 25, 1949

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AERONAUTICS

Red for Cockpit Lighting

➤ NIGHT FLYING is claimed to be safer with a new type of radio control panel for airliner and military cockpits which utilizes red lighting to eliminate glare and minimize eye fatigue for the pilot.

It is a development of Bendix Radio Division of Baltimore, and is the result of extensive studies by psychologists in determining human factors in accurately reading aircraft instruments. It was found that dials lighted with white light tend to dazzle the eye with glare, especially when the pilot is required to read a lighted panel and then quickly adapt his vision for seeing outside.

Red lighting, it was determined, was ideal for better cockpit uses. In the new device, to be known as "Da-Nite" panel, the light is transmitted throughout the inside of the specially processed plastic panel itself, thus eliminating shadows. A red filter is provided in a newly designed tiny light socket holding a sub-miniature light bulb.

Multiple tiny light elements are used and they are scientifically spaced to give uniform lighting to the whole panel. With this development, pilots not only see better and quicker, either in the dark or daylight, but the eye adapts itself to changing visual conditions with greater speed.

When a pilot's eyes glance at a panel lighted with white light, they become dazzled by the light and time is required for them to adapt themselves to see the outside terrain, Bendix scientists explain. Studies made by them resulted in the finding that red is ideal for better cockpit lighting. It does not paralyze the eyes as the white light appears to do.

In describing the new development, John W. Hammond, of the Bendix company, pronounced it "a virtually perfect night lighting system for aircraft control panels." Letters, numerals and other markings are applied to the plastic panel by a newly developed photographic process, he said. In daylight the markings appear an eggshell white against a non-reflecting black background. In darkness, red light within the plastic panel causes the letters and numerals to become a deep red. In either daylight or darkness the characters are bold, with sharply defined edges due to the high quality of the photographic process. Quick eye adaptation, less fatigue, and high comprehension of legends are assured, he added.

Science News Letter, June 25, 1949

CAR BUYERS BEWARE
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Do you know the 36 tricks used to defraud new and used car buyers? A fair price to pay? A fair trade-in? Fair financing and insurance? The costs of running a car? How to spot a "lemon"? A stolen car? These and many other questions are clearly answered in the 96 easy-to-read pages of:

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• Books of the Week •

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ANALYTIC GEOMETRY AND CALCULUS: A Unified Treatment—Frederic H. Miller—*Wiley*, 658 p., illus., $5.00. Plane and solid analytic geometry, differential calculus, and integral calculus have been correlated as a single branch of mathematical analysis.

ANNUAL REPORT—*Chicago Natural History Museum*, 138 p., illus., paper, $1.00.

CHILDREN'S BOOKS FOR SEVENTY-FIVE CENTS OR LESS—Mabel Altstetter—*Association for Childhood Education International*, 50 p., paper, 35 cents. Books that seem most childlike or most useful are listed. Classification, price and brief annotation are given.

CULTURAL RELATIONS BETWEEN THE UNITED STATES AND THE SOVIET UNION—Department of State—*Gov't Printing Office*, 25 p., paper, 10 cents. An analysis of the cultural exchange of persons and of the exchange of publications.

THE EARHART PLANT RESEARCH LABORATORY—F. W. Went—*Chronica Botanica*, 17 p., illus., paper, free upon request to publisher, P.O. Box 151, Waltham 54, Mass. Description of a new laboratory where plants can be grown under simultaneously and independently controllable conditions.

A FURTHER CONTRIBUTION TO THE ICHTHYOLOGY OF VENEZUELA—Leonard P. Schultz—*Smithsonian Institution*, 211 p., illus., paper free upon request to publisher, Washington 25, D. C. The third report on collections made by the authors in Venezuela during 1942. No. 3235 of the proceedings of the U. S. National Museum.

GETTING ALONG WITH OTHERS—Helen Shacter—*Science Research Associates*, 48 p., illus., paper, 60 cents. Latest in the series of SRA's Life Adjustment Booklets for young people.

HEADACHES: What Causes Them, How to Get Relief—Noah D. Fabricant—*Farrar Straus*, 149 p., $2.50. A doctor's advice to the layman not intended to take the place of a visit to his own physician.

INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS: Report of the Executive Committee, 1948—F. J. M. Stratton, Ed.—*Cambridge University Press*, 109 p., paper, 5 shillings (Approximately $1.00).

LINDA RITA: Pre-primer—21 p., 15 cents; JUAN EL POBLANO: Pre-primer—25 p., 20 cents; EL BUEY QUE QUERIA VIVIR EN LA CASA: First Grade Reader—45 p., 25 cents; EL CERDITO QUE FUE AL MERCADO: First Grade Reader—54 p., 45 cents: PATOS SON DIFERENTES: First Grade Reader—35 p., 25 cents; LA GALLINA QUE QUERIA AYUDAR: First Grade Reader—43 p., 25 cents; EN EL CAMINO DE LA ESCUELA: Second Grade Reader—76 p., 40 cents—Ann Nolan Clark—*Gov't Printing Office*, illus., paper. Seven texts prepared under the auspices of the Education Division of the Institute of Inter-American Affairs for the teaching of reading in Spanish by the 'sentence' method. Illustrations and text closely represent the life of children of the Latin-American countries.

MANUAL OF CULTIVATED PLANTS—L. H. Bailey—*Macmillan*, rev ed., 1116 p., illus., $17.50. Provides fresh material and current nomenclature on plants commonly grown in the United States and Canada.

MEDICAL ETYMOLOGY—O. H. Perry Pepper—*Saunders*, 263 p., $5.50. The history and derivation of medical terms for students.

MEDICINE OF THE YEAR: First Issue 1949—John B. Youmans, Editorial Director—*Lippincott*, 143 p., $5.00. A review by leaders in various fields of medicine of the medical developments of an eventful year.

OUR SUN—Donald H. Menzel—*Blackiston*, 326 p., illus., $4.50. A new addition to the Harvard books on Astronomy which are edited by Harlow Shapley and Bart J. Bok, telling how the sun affects the earth and human beings.

PAINTING WITH LIGHT—John Alton—*Macmillan*, 191 p., illus., $6.00. A study of both the technical and the artistic aspects of lighting by one of the leading photographers. The illustrations are mostly by the author with three full-page colored photos.

PARENT EDUCATION IN THE NURSERY SCHOOL—Edith N. Norton—*Association for Childhood Education International*, 30 p., paper, 50 cents. A realistic approach is presented for those working in nursery education as well as parents and teachers of children of all ages.

PHYSICS: The Story of Energy—H. Emmett Brown and Edward C. Schwachtgen—*Heath*, 593 p., illus., $3.20. Stresses the inductive method, the use of experimental data and a distinctive organization. A high-school text.

QUANTITATIVE ORGANIC ANALYSIS VIA FUNCTIONAL GROUPS—Sidney Siggia—*Wiley*, 152 p., illus., $3.00. Gives working methods for determining organic compounds by the functional groups on the molecules. For the laboratory analyst.

QUANTITATIVE PHARMACEUTICAL CHEMISTRY—Glenn L. Jenkins, Andrew G. DuMez, John E. Christian, and George P. Hager—*McGraw-Hill*, 3rd ed., 531 p., illus., $4.75. Brought up to date to conform to the new U. S. Pharmacopoeia XIII and the National Formulary VIII.

STUDIES IN LATIN AMERICAN ART—Elizabeth Wilder, Ed.—*The American Council of Learned Societies*, 106 p., paper, 50 cents. The proceedings of a Conference held in the Museum of Modern Art, New York, May 28-31, 1945, under the auspices of the Joint Committee on Latin American Studies, the National Research Council and the Social Science Research Council.

VOLUNTARY PARENTHOOD—John Rock and David Loth—*Random House*, 308 p., $3.00. Why some couples have no children and others too many. Practical advice on family planning.

WHY ARE YOU SINGLE?—Hilda Holland, Compiler—*Farrar Straus*, 278 p., $3.00. Studies of why men and women of marriageable age do not marry.

Words in Science— MENTAL AGE—I.Q.

➤ BY repeated testing, psychologists have found out what problems can be solved by the average child at various ages. If a boy or girl can do the things that the average 6-year-old can accomplish, he or she is said to have a mental age of six.

I. Q. which stands for intelligence quotient, is found by dividing mental age by the age in birthdays. Thus if an 8-year-old boy has a mental age of six, his I. Q. is six divided by eight or 75. If on the other hand, the tests show that he can do what is expected of the average child of 10, his I. Q. is 125. Thus, "par" is 100. I. Q's above 100 are assigned to brighter than average children. Those below 100 indicate below average intelligence.

Science News Letter, June 25, 1949

WILDLIFE

Opossum's Diet Shows He Eats Just About Anything

➤ THE 'possum's reputation for eating just about anything it can get its teeth into is well borne out in a study of the contents of opossum stomachs made by Prof. W. J. Hamilton, Jr., of Cornell University.

Before the meeting of the American Society of Mammalogists in Washington he presented the inventory:

"The stomachs examined in New York State have been from animals collected by trappers, both summer and winter, or from highway victims. Fall and early winter foods include small mammals, green vegetation, wild fruits, amphibians, insects, birds, molluscs and grains. Spring and summer food includes toads, frogs, salamanders and snakes, small birds and mammals, fruits, insects and earthworms. Almost all food items are secured on the ground."

Prof. Hamilton also studied the food habits of raccoons as compared with opossums. He found a considerable degree of similarity, except that the raccoon appears to eat more insects and grains.

Science News Letter, June 25, 1949

TRANSPAR PLASTIC KIT

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FENDER PROTECTOR is a flexible attachment to put on a fender of an automobile which will touch a high curb, before the fender is close enough to be crushed, and operate a warning buzzer under the hood. The electric contacts are sealed in a hard rubber ball with a chrome-plated tip, and the spring is of stainless steel.

Science News Letter, June 25, 1949

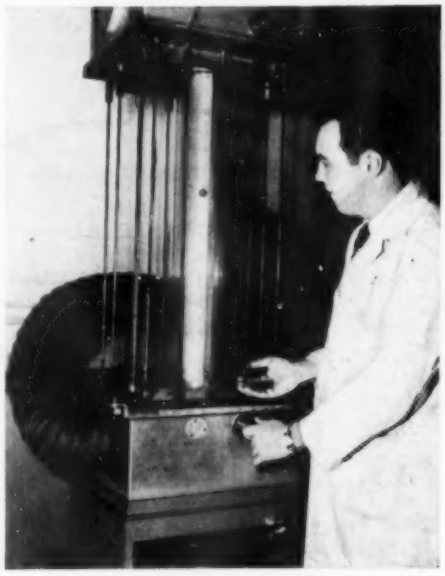
REMOTE CONTROL unit, for use with any make of television where the receiver must be put in an inaccessible place, can be used to tune in stations, regulate contrast and brightness, and to turn the set off. Another use is with projection sets where tuning can best be accomplished at a distance from the screen.

Science News Letter, June 25, 1949

SPHERICAL container, made of a plastic and the size of a golf ball, separates into two halves, one holding a nylon-bristle brush and the other a metal spike for use on the greens in cleaning shoe cleats and golf clubs. The spike is threaded, and serves to hold the halves together when not in use.

Science News Letter, June 25, 1949

REBOUND DEVICE, to test the resiliency of new types of rubber made for use in sub-zero temperatures, determines this essential property by the height to



which a metal ball rebounds when dropped from the top of the tubes shown in the picture. At room temperatures, a ball bounces to the top of the tube from pure gum rubber.

Science News Letter, June 25, 1949

POCKET CASE for fishermen keeps sharp hooks and fragile lures safely in boxes easily visible through the transparent material of which both boxes and the case itself are made. It is usable also by scientists to hold small specimens gathered on field trips.

Science News Letter, June 25, 1949

OIL CANS, for household equipment, have bodies of colorful, shatterproof, transparent plastic crimped onto a tinned steel base, flexible for squirting action. The threaded neck of the container, in which the oil supply is always visible, holds a metal spout with straight or bent tip.

Science News Letter, June 25, 1949

MILK CONTAINERS, in half-pint to quart sizes, are made by using tasteless, odorless Vinylite resins to coat rolls of paper, from which the containers are die-cut in the flat. Shipped to dairies in this flat condition, they are fed into equipment that automatically forms, sterilizes and fills them in one operation.

Science News Letter, June 25, 1949

VOICE MUFFLER, to snap on the speaking end of the telephone, permits talk which is heard only by the person at the other end of the phone. A telephone in a busy office can be used without disturbance to others in the room by the flexible device which covers the speaker's mouth.

Science News Letter, June 25, 1949

Do You Know?

American Indians were using *sunflower seed* as food when the earliest European explorers discovered this country.

Autotrucks, with the latest mine-rescue equipment, have now completely replaced in the continental United States, the old government railroad mine rescue cars which rushed to mining accidents to help save lives.

The Brazilian *carnauba palm,* whose leaves furnish the valuable carnauba polishing wax, produces fruit for cattle feed, seeds used as a coffee substitute, sap to make wine and vinegar, and lumber impervious to salt water and insects.

Some 50 inches of *rainfall* a year in parts of the United States is a high average, but the Assam hills in northeast India often have over 50 feet a year due to the moisture-carrying winds from the Indian ocean in the monsoon season.

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